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NAIL CUTTERS

U. S. PATENT OFFICE

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NO. OF CLAIMS 9

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This invention relates generally to nail cutting appliances and more particularly to an appliance designed to trim the toe nails of invalids, hospitalized people, the bedridden, or of any person requiring regular toe nail attention by a qualified practitioner such as a nurse or podiatrist.

It is often the case that certain people, particularly the aged or bed-ridden, develop a thickening of the toe nails which causes considerable trouble in the cutting thereof. The conventional nail cutters, clippers, scissors and the like while proving quite adequate for the trimming of normal thicknesses of toe nails are not particularly adaptable in dealing with abnormal growth. Furthermore, the majority of the abovementioned devices rely upon manual operation and incorporate few adequate safety features and are relatively difficult to handle when used to trim thickened or deformed nails.

Having in mind therefore the lack of existing equipment for use in these cases it is a primary object of my invention to provide a nail cutting device referred to hereinafter as a nail cutter which is specifically designed for the cutting of abnormal nail growth.

Another important object of the instant invention is to provide a nail cutter which is motivated by electrical power.

Yet another object of the present invention seeks to provide a nail cutter which is easy to operate and safe in use.

Still a further object of my invention provides a nail cutter, the cutting unit of which is detachably attached to facilitate quick replacement when required.

Another object of my invention is to provide a nail cutter which is of strong construction and attractive appearance and which may be produced at a relatively inexpensive price.

These and various other pertinent objects and features of the instant invention will become more readily apparent from the following detailed description of parts and assemblies and when taken in conjunction with the accompanying

drawings, in which: -

Fig. 1 is a perspective view of a nail cutter embodying the invention and showing a flexible drive and foot switch motor embodied therewith.

Fig. 2 is a part cut away sectional side elevation of the invention as illustrated in Fig. 1 taken on the line 2-2 and showing an operator's hand and patient's toe in phantom.

Fig. 3 is a plan view of the guard assembly incorporated in the invention.

Referring to Figs. 1 and 2, a nail cutter indicated generally by the arrow 10 includes a hollow cylindrical housing 11 having a first end 12 and a second end 13. End 12 is lightly curved and formed into a handle having transverse depressions 12a formed therein to accommodate the grip of a user's hand, and opposite end 13 terminates in a reduced section 13a, section 13a having an internal thread 13b formed thereon.

Housing 11 should preferably be split longitudinally in two sections 11a formed from a suitable impact resistant plastic material or the like, although it is not intended to limit the material to such.

A cutting head assembly referenced generally by the arrow 14 includes a hollow cylindrical member 15 having an inwardly disposed circular flange 15a formed on one end thereof and having its opposite end stepped down to produce a reduced section 15b. An external thread 15c formed on reduced section 15b is operable with internal thread 13b of housing 11 so that upon engaging threads 13b and 15c to the full extent cutting head assembly 14 is joined longitudinally end 13 of housing 11 in a flush fit.

A flexible drive shaft 16, having a first end 16a and a second end 16b connected at end 16a to a fractional horse power motor 17 and has its opposite end 16b located centrally and longitudinally within housing 11 first passing through an opening 18 formed centrally within end 12 and being supported therewith a flanged bushing 19. Bushing 19 projects outwardly from end 12 of housing 11 and has a threaded portion 19a formed thereon which is adapted to receive an

internally threaded end cap having an orifice 20a formed centrally therethrough to receive flexible drive shaft 16.

Motor 17 which is adapted to be connected to a conventional main supply by the lead 17a has an on/off switch 17b included and a foot switch 17c.

Foot switch 17c is optional and would find acceptance among medical staff or practitioners rather than among those acquiring nail cutter 10 for home use.

A support member 21, located transversely within housing 11 and toward end 13 thereof retains flex drive 16 centrally within housing 11.

10 Flexible drive 16 terminates in a rigid section 16c, section 16c having a collar 22 integral therewith and located at a first end 16d of section 16c, collar 22 bearing against a stop ring 23 integral with the covering of flex drive 16. Thus longitudinal play of flex drive 16 within its covering is limited.

A ball bearing member 24 is located centrally within circular flange 15a of member 15 and together with a cooperable oil seal 24a receives end 16e of section 16c, section 16c projecting longitudinally outwardly from member 15 and terminating in a reduced section 16f and a threaded portion 16g.

20 A circular cutting head 25 has its peripheral edge supplied with a plurality of fine teeth or serrations 25a and is adapted to be mounted concentrically upon end 16e of section 16c, an orifice 25b formed centrally therethrough receiving reduced section 16f in a sliding fit and a retaining cap 26 having an internal thread 26a being adapted to receive threaded portions 16g.

It should be noted that both reduced section 16f of section 16c and orifice 25b of cutting head 25 should preferably be of rectangular section or the like in order to ensure their common rotation.

30 Referring now to Figs. 1, 2 and 3 a shield unit 27 includes a substantially cylindrical jacket 27a having a semi-circular end wall 27b and a cut out section 27c. A longitudinal slot 27d formed within jacket 27a is flanked by two upwardly projecting lugs 28 which are adapted to receive a pin 29 and a

knurled nut 29a.

In assembly, shield unit 27 is mounted upon member 15 with slot 27d uppermost, cut out section 27c exposing only the bottom half of cutting head 25. Pin 29 and nut 29a are tightened thereby clamping jacket 27a about member 15. It will be apparent that a minimum of clearance between cutting head 25 and end wall 27b of member 15 will be sufficient.

A spring steel member 30 is located on the underside of jacket 27 and rigidly attached thereto by rivet means or the like. Member 30 is so shaped as to conform to the contour of jacket 27 and projects longitudinally outwardly therefrom, passing beneath cutting head 25 and terminating in a platform section 31. A U shaped trough 32 is formed transversely within member 30 and located immediately subjacent the toothed edge of cutting head 25.

In operation nail cutter 10 is connected to a main supply via lead 17a, motor 17 being switched on and foot switch 17c operated selectively as required. Table section 31 is inserted beneath the nail and against the spring tension of member 30, cutting head 27 being positioned over and in contact with the nail to be cut. Foot switch 17c is activated and cutting head 25 allowed to bear down and shear off a section of nail by circular cutting action.

It should be noted that the degree of cut is governed by the length of table section 31 and the extent to which section 31 is introduced between the nail and toe.

Thus by repositioning cutting head 27, sections of nail may be cleanly sheared, any rough edges or points being easily smoothed off by a conventional nail file after the cutting operation has been completed.

Upon the teeth of cutting head 25 becoming worn through frequent use, replacement of cutting head 25 is simply effected by dismantling cutting head assembly 14, removing retaining cap 26 and substituting a new cutting head.

The general design of the individual parts of the invention as explained above may be varied according to requirements in regards to manufacture and production thereof, while still remaining within the spirit and principle of the invention, without prejudicing the novelty thereof.

THE EMBODIMENTS OF THIS INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS: -

1. A nail cutter for use on deformed or thickened toe nails including housing means; a cutting head assembly; an exposed cutting head; means for the rotation of said cutting head; support means for insertion beneath a toe nail, said support means forming part of a resilient strip secured at one end to said housing and passing immediately subjacent said cutting head and at right angles thereto.
2. A nail cutter as defined in Claim 1 in which said housing means include a hollow cylindrical form having one end handle shaped to accommodate a user's hand and having its opposite end open supplied with an internal thread; said housing means having an orifice formed through said handle shaped end; a flanged bush located within said orifice, said bush projecting outwardly therefrom and having an external thread formed on said outward projection; an internally threaded end cap, said end cap having a through orifice and threadably receiving said projection of said bush; and cable support means located within said housing substantially towards said open end.
3. A nail cutter as defined in Claim 1 in which said cutting head assembly includes a hollow cylindrical member having an inwardly disposed flange formed on one end thereof and having its opposite end reduced in section and externally threaded; said member being threadably attached to said housing and in longitudinal alignment therewith; and ball bearing means located centrally within said flange and in axial alignment with said member.
4. A nail cutter as defined in Claim 1 in which said cutting head is circular in configuration and has a plurality of teeth formed on its peripheral edge, said teeth projecting radially outwardly of said cutting head.
5. A nail cutter as defined in Claim 1 in which said means for the rotation of said cutting head include a flexible drive, said drive being powered by a motor external of said housing, said flex drive being supported centrally and longitudinally within said housing; a terminal section of said drive, said section being rigid and passing through said ball bearing to project outwardly of

said cutting head assembly; and said circular cutting head being mounted axially and rigidly upon the end of said terminal section of said flex drive.

6. A nail cutter as defined in Claim 1 including a shield unit, said shield unit comprising a substantially cylindrical jacket; a longitudinal slot formed within said jacket said slot being flanked by upwardly extending lugs; screw means whereby said lugs may be biased together thereby tightening said jacket; a semi-circular end wall; a cut away section, said section being located subjacent said end wall; said jacket being mounted on said cutting head assembly in such a position as to expose the lower half of said cutting head; and minimum clearance between said end wall of said jacket and said cutting head.

7. A nail cutter as defined in Claim 1 in which said resilient strip has a U shaped trough formed transversely therein, said trough being located immediately subjacent said peripheral edge of said cutting head.

8. A nail cutter as defined in Claim 1 in which said cutting head is detachably attached within said cutting head assembly.

9. A nail cutter for use on deformed or thickened toe nails including housing means, said housing means being of hollow cylindrical form having one end shaped to accommodate a user's hand and having its opposite end open and supplied with an internal thread, said form having an orifice through said handle shaped end; a flanged bush located within said orifice, said bush projecting outwardly therefrom and having an external thread formed on said outward projection; an internally threaded end cap, said end cap having a through orifice and threadably receiving said projection of said bush; cable support means located within said housing substantially toward said open end; a cutting head assembly including a hollow cylindrical member having an inwardly disposed flange formed on one end thereof and having its opposite end reduced in section and externally threaded, said member being threadably attached to said housing and in longitudinal alignment therewith; ball bearing means located centrally within said flange and in axial alignment with said member; a cutting head, said cutting head being circular in configuration and having a plurality of teeth formed on its peripheral edge, said teeth projecting radially outwardly of said cutting

head; means for the rotation of said cutting head including a flexible drive, said drive being powered by a motor external of said housing, said drive being supported centrally and longitudinally within said housing; a terminal section of said drive, said section being rigid and passing through said ball bearing to project outwardly of said cutting head assembly; said cutting head being mounted axially and rigidly upon the end of said terminal section of said flex drive; a shield unit, said shield unit comprising a substantially cylindrical jacket; a longitudinal slot formed within said jacket, said slot being flanked by upwardly extending lugs; screw means whereby said lugs may be biased together thereby tightening said jacket; a semi-circular end wall; a cut away section within said jacket, said section being located subjacent said end wall; said jacket being mounted on said cutting head assembly in such a manner as to expose the lower half of said cutting head; a minimum clearance between said end wall of said jacket and said cutting head; support means for insertion beneath a toe nail, said support means including a resilient strip attached at one end to the underside of said jacket of said shield unit, said resilient strip passing beneath said cutting head and at right angles thereto; a U shaped trough formed transversely of said resilient strip, said trough being located immediately subjacent said peripheral edge of said cutting head; and said cutting head being detachably attached within said cutting head assembly.

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Схема  
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Fig. 1

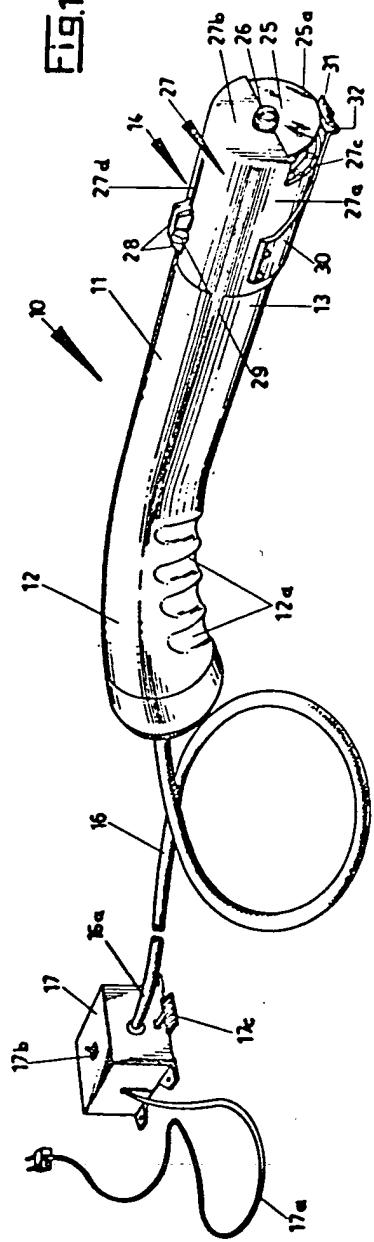


Fig. 2

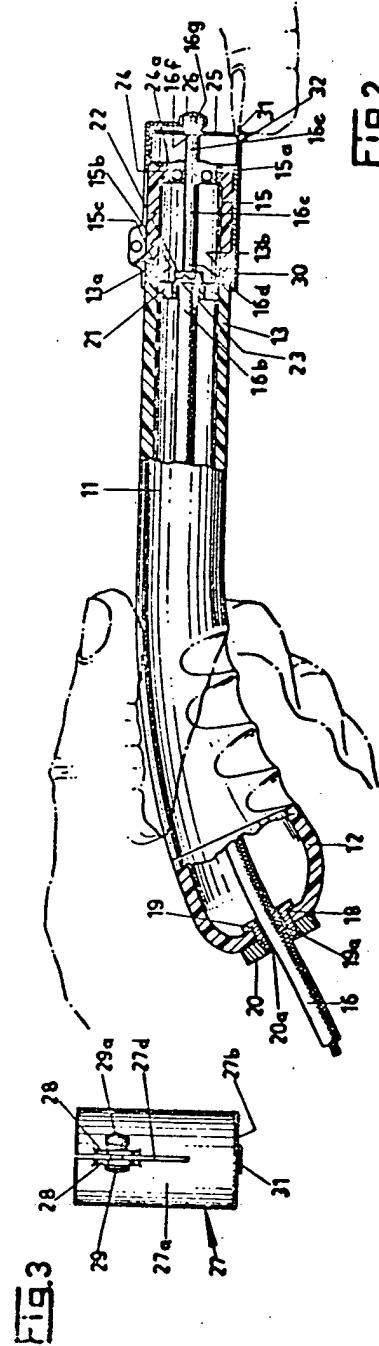


Fig. 3